

Dakota State University

Residence Village

Facility Design Plan

Dakota State University requests approval of the Facility Design Plan to construct a new residence hall on the campus. The Preliminary Facility Statement for this project was approved by the Board of Regents on May 9th, 2018. April 3rd, 2019, the Board of Regents approved the Facility Program Plan.

A. Architectural, Mechanical, and Electrical Schematic Design

Architectural:

The planned facility will have 128 beds across 4 floors with a unit mix of 4-bedroom suite style units and 6-bedroom apartment style units. Common spaces include student lounges and study spaces, shared laundry facilities and corridor and vertical circulation. The new site location will allow the facility to connect to the Courtyard project through the existing stair tower creating a large community of upper-class students. The building is being designed for potential future expansion to the west. See *Attachment-1 for current site plan and floor plans.*

The building structure is planned to be a combination of load-bearing steel studs and structural steel columns and beams supporting precast concrete hollow core floors and a wood roof-truss system. Interior partitions would be light gauge steel studs and gypsum board with hollow metal frames and solid core wood doors. The corridor partition walls and common walls between units will be designed to provide acceptable levels of sound privacy.

The exterior cladding of the building will include a combination of masonry veneer (low) and light weight cladding (high). The windows within the living units will be sliding aluminum or fiberglass windows. The larger expanses of glass at the common spaces on the corner will be an aluminum storefront system. The roof will be a combination of architectural asphalt shingles over the sloped wood trusses and fully-adhered EPDM membrane at low-slope roof areas. See *Attachment 2 for current exterior renderings.*

Mechanical:

HVAC System (Bulldog HEAT PUMPS):

Suites/Apartment Units with Mechanical Closets

Each individual suite would have a compact bulldog heat pump located in a mechanical closet within the suite. This combination heating-and-cooling bulldog heat pump unit allows comfort control for each individual suite. This 2-pipe closed loop heat transfer piping system allows synchronous heating & cooling in different suites at the same time. Within the suites supply and return ductwork will distribute air into the rooms. Fresh air would be ducted into each suite's HVAC unit and pulled into the return thus mixing with return air and distributed throughout the suite. Mechanical closets with doors to the hallway would provide service access without entering the student's space.

Study Rooms, Etc.

These study rooms would have individual vertical stacked units serving individual rooms with individual control. Neutral fresh air would be ducted into each space in areas served by these vertical stacked style units. Access to the unit for service would need to be through the space.

Common Areas

The common areas will utilize the same system that is used for the individual suites. The quantity and type of heat pump units used will be selected based on how the spaces are utilized to maximize the system efficiency and comfort control throughout the common areas. Again, fresh air would be mixed with the return air into the heat pump units and distributed throughout the common areas to maximize indoor air quality. Any office areas would be served by ducted horizontal units concealed above ceilings, while stairwells and vestibules would utilize console units.

Temperature Controls

The temperature control system shall be an extension of the existing DDC control system. All equipment shall be controlled and monitored by the existing color graphic operator's workstation for Owner's designated personnel to change schedules and setpoints.

Hydronic System

The hydronic piping will consist of an insulated, two-pipe hydronic water loop that will use circulating pumps to circulate water to all of the Bulldog Hybrid Heat Pumps. This will allow the heat pumps to extract heat from the water loop when they are in heating mode and reject heat to the water loop when they are in cooling mode. As previously mentioned, the water loop will thus transfer heat from one heat pump to another within the building. The two-pipe hydronic piping system is designed to circulate between 85F and 125F fluid (the supply fluid temperatures are increased as the outside air temperatures drop).

Heat Injection & Heat Rejection

Heat will only be injected or rejected from the water loop as needed to maintain the water loop temperature within a range to optimize the operating efficiency of the heat pumps. If the water loop temperature drops below the range minimum, heat will be injected using high efficiency, natural gas fired boilers. If the water loop temperature rises above the range maximum, heat will be rejected using a closed circuit, fluid cooler.

Ventilation Systems

The ventilation system will utilize a packaged natural gas-fired electric-cooling energy recovery unit that will supply neutral air to designated heat pumps or designated spaces. The energy recovery units will transfer energy from the exhaust air stream to the outside air, then heat or cool or dehumidify the air before distributing it within the building. The ventilation system will be sized to meet the Green Globe requirements.

PLUMBING SYSTEM:

The plumbing system shall consist of the following:

Plumbing Fixtures

Plumbing fixtures to be high efficiency low water consumption fixtures to meet the requirements for the Water Use Reduction Green Globe credits. Fiberglass showers are planned in all suites. Exterior wall hydrants to be located such that they cover the perimeter exterior of first floor.

Domestic Water Piping & Insulation

To prevent pitting, scaling, or corrosion aboveground domestic cold, hot, and recirculating hot water piping & fittings shall be Uponor Pex A with a twenty-five-year warranty. The exception will be all piping within the mechanical room at the water meter fit and domestic hot water system will be Type L copper. All mains & branch piping shall be insulated with fiberglass with vapor barrier.

Domestic Hot Water System

Natural gas fired, high efficiency domestic hot water heaters will be utilized to provide domestic hot water for the building. A domestic hot water recirculation system will be used to ensure that the building occupants don't have to wait for hot water.

Sanitary Waste/Venting

All sanitary waste and venting shall be PVC piping, and cast iron when within return air plenums.

Natural Gas Piping

All natural gas piping shall be schedule 40 black pipe with isolation valves and pressure reducing valves as necessary serving high efficiency hot water boilers & water heaters.

Storm Drainage

Room drainage is to be scuppers and downspouts. If required primary & overflow roof drains for any flat roof areas will be PVC piping encased in insulation piped down to below grade to the city storm sewer.

Condensate Drainage

All condensate drain piping shall be PVC piping encased in insulation.

Fire Sprinkler System:

A complete fire sprinkler system will be installed meeting NFPA, local codes, & the Fire Marshal.

The system shall consist of a dedicated 6" fire protection water service located in the mechanical room with zoning installed per floor. The fire sprinkler riser within the mechanical room shall be iron pipe & fittings. CPVC piping concealed within the truss space shall be used for the majority of the facility. All piping to be rated for fire sprinkler installation. Flush concealed heads shall be used throughout the facility.

Electrical:

Lighting System:

Apartment Lighting

LED fixtures will be used. The bedroom fixtures will be controlled by vacancy/dimmer switches to maximize the energy savings by combining the functionality of a vacancy sensor with the versatility and ambiance control of a dimmer.

Hallways and Common Areas

LED fixtures will be used. Hallways and common areas will be controlled using a combination of sensors, standard switches, or dimmers as appropriate to allow the occupants maximum comfort for a variety of activities.

Exterior Lighting

LED fixtures will be used. Nighttime friendly fixtures will be utilized to help mitigate light pollution. For student/faculty safety any pathway lighting shall be operated by photocell control, on at dusk, off at dawn. LED fixtures will be used on the building and for bollards. All exterior lights will be controlled by photocells out of a lighting control panel. For student/faculty safety any pathway lighting shall be operated by photocell control, on at dusk, off at dawn.

Fire Alarm System / Life Safety Systems:

The fire alarm system shall be installed to meet the present code requirements and meet DSU's standards. A fully addressable system will be used. The fire alarm system shall be able to communicate on the campus network through the Metasys BAS. Exit and emergency lighting will be placed according to life safety codes.

Data / Phone System:

The data system will be installed by a BICSI certified installer. CAT6A cabling will be used throughout the building. Panduit network racks with cable management will be utilized. The data and phone systems will be connected to the campus system using fiber optic cable.

Security System:

The security system will consist of rough-ins for the cameras and door accesses systems. The locations would be coordinated with the owner. Rough-ins would consist of empty conduits and boxes. The security equipment and cabling would be by owner.

Power System:

The campus loop system is the preferred choice to bring power in for the building. Service will be 120-208V 3 Phase with individual apartment panels distributing 120-208V single phase. Common area lighting, power, and equipment will be metered according to the Green Globe's requirements. Additional monitoring for power system is yet to be determined. The power consumption could be monitored through the BAS.

All electrical devices (switches, outlets) will be commercial grade. All wiring will be in accordance with the National Electrical Code and the South Dakota State Electrical Commission Wiring Bulletin. The apartment building will have MC cable for branch circuits. EMT conduit raceway system will be used for feeders and homeruns.

B. Changes from Facility Program Plan

There are several changes from the Facility Program Plan submitted to the Board in April 2019.

Location

The previous location proposed was the NW corner of 9th Street and Washington Avenue. This is currently a parking lot. After review, a more ideal location was determined. The new facility would be connected to the current Courtyard Hall and located just south of that building (location of former Madison Clinic, which was razed shortly after DSU acquired the property).

Staffing

By connecting the new residence hall to the existing Courtyard Hall, the University can eliminate the need for an additional Residence Hall director position. One RD can then manage the existing Courtyard

(107 beds) and the new residence hall as one residence hall, thus eliminating operating costs in the auxiliary system and improving the pro forma.

Bed Count – Change from 120 to 128

By eliminating the need for an RD, there is also no need for an RD apartment within the new residence hall. This space is then converted to student housing, thus increasing the bed count from the Facility Program Plan of 120 to 128 beds in the Facility Design Plan.

Total Project Cost

Because of the decreased staffing costs and increase in bed count (without additional space), the pro forma improves and thus allows for a greater total project cost than submitted in the Facility Program Plan. The FPP has a total project of approximately \$10.6 million. Changes to the pro forma allow for the project to increase to \$11.5 million. This also allows for some improved construction types that will benefit the long-term maintenance of the building, including but not limited to a combination steel and wood construction as opposed to a wood only system.

Other Pro Forma Improvements

The overall pro forma has also improved because of changes to Van Eps Place. This property has been under renovation the last year and within the Facility Program Plan, anticipated 20 beds at 90% occupancy. The final floorplan for the Van Eps Place contains 23 beds. The pro forma still assumes a 90% occupancy.

Within the new residence hall, the original plan included four residence hall advisors. Due to the types of rooms and these students being upper-class students, only two RA's are needed, thus decreasing the operating costs of the facility.

C. Impact to Existing Building or Campus-wide Heating/Cooling/Electrical Systems

The new residence hall will have stand-alone heating system, thus not impacting the current boiler plant facility. DSU is still determining if the new building will connect to the campus electrical loop or direct connect to the utility provider, similar to how the Courtyard/LEC is connected. The new residence hall would connect physically to the Courtyard, which will have programmatic benefits. The connecting point to the Courtyard was designed to connect to another building (former clinic) so there is no significant impact to that existing building.

D. Total Construction Cost Estimates

Total project cost is \$11.5 million including construction, fees, furnishings as identified in the following table. Several changes have been made to the program previously submitted with the Facility Program Plan, which allows the budget to increase and still meet all financial requirements. The detailed FDP budget is as follows:

Description	Budget amount
Construction Costs	\$8,732,000
CMR Fee	\$455,000
Total Contingency	\$800,000

Professional Fees	\$545,000
Green Globes Professional Fee	\$87,725
OSE Fee	\$30,000
FF&E	\$750,000
Commissioning	\$50,000
Geotechnical, Survey, and Construction Testing	\$34,950
Miscellaneous Fees	\$15,325
Total	\$11,500,000

E. Changes from Cost Estimates for Operational or M&R Expenses

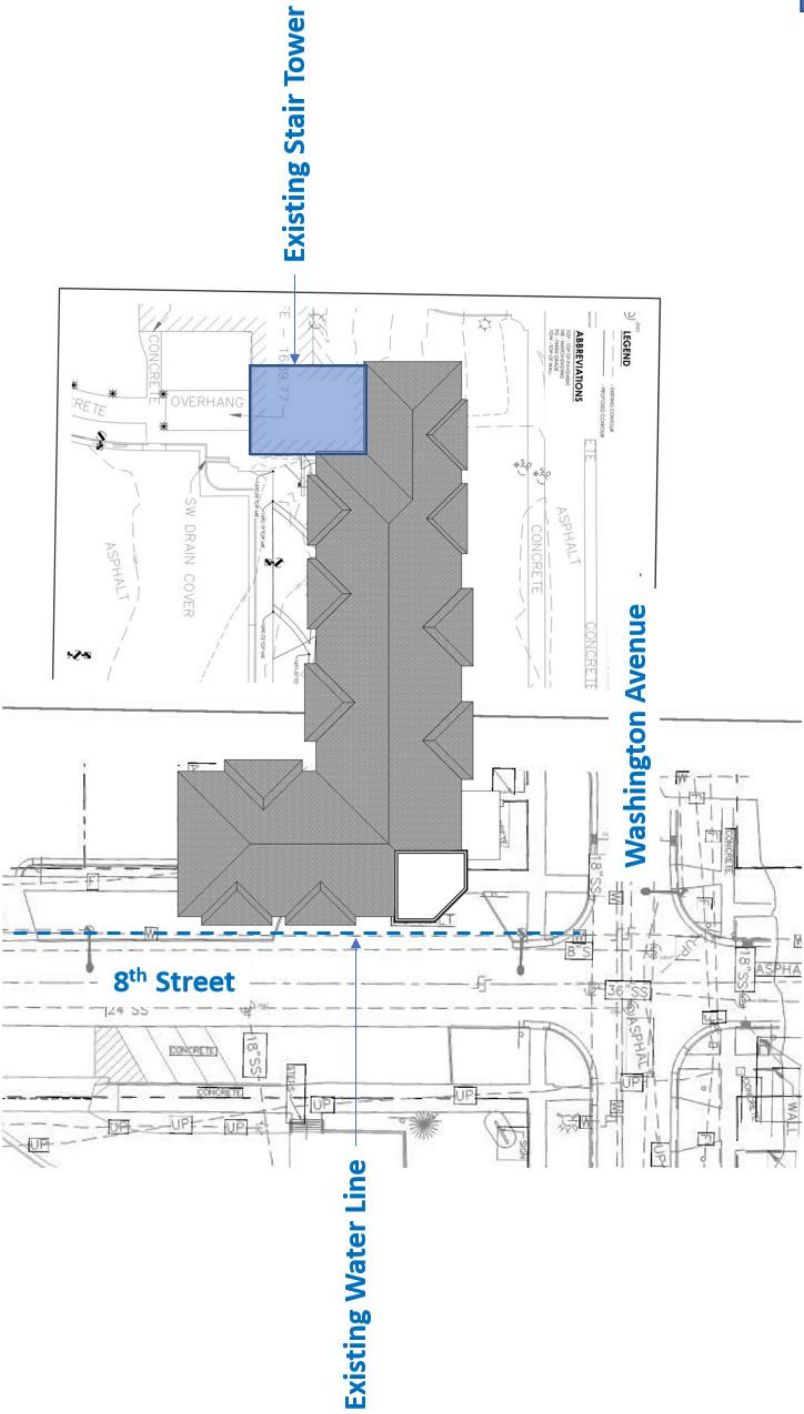
The operational cost estimates for the new residence hall have changed slightly. As noted in previous sections, the change of location allows for the university to add the new residence hall without adding an additional residence hall director. This decreases the costs to operate the new hall considerably.

The cost estimates for M&R expenses change slightly. The total project cost increase results in a larger M&R expectation (2% of a now larger replacement value). However, the increase value allows for improved construction material and design. This will reduce the actual M&R costs in the future.

F. Planned Project Timeline:

Project Phase	Dates
<i>Board of Regents – Facility Program Plan Approval</i>	<i>April 2-4, 2019</i>
Construction Manager Selection	May 2019
Schematic Design	June 3 – July 12 (6 Weeks)
Design Development <i>Board of Regents – Facility Design Plan Approval</i>	July 15 – August 23 (6 Weeks) <i>August 6-8, 2019</i>
GMP from Construction Manager	September 20 (4 weeks)
Construction Documents *	September 23 – December 31, 2019 (14 Weeks)
Construction	April / May 2020 – July 2021 (14-15 months)
Occupancy	August 2021

Attachment I – Site Plan:



Site Plan



DAKOTA STATE
UNIVERSITY

DSU RESIDENCE VILLAGE



KWK ARCHITECTS
Architecture
Incorporated

Attachment II – First Floor:



Architecture
Incorporated
KWK ARCHITECTS

DSU RESIDENCE VILLAGE

First Floor



Architecture
Incorporated
KWK ARCHITECTS

2nd, 3rd, 4th Floors

DSU RESIDENCE VILLAGE

Attachment IV – Suite and Apt. Detail:



Attachment V – Aerial Views:

Aerial view looking north



DSU RESIDENCE VILLAGE



Aerial view looking east



DSU RESIDENCE VILLAGE



Corner Eight and Washington



DSU RESIDENCE VILLAGE



Corner Eight and Washington



DSU RESIDENCE VILLAGE

